10th Class 2018

Chemistry	Group-I	Paper-II
Time: 1.45 Hours	(Subjective Type)	Marks: 48

(Part-I)

2. Write short answers to any FIVE (5) questions: 10

(i) What is meant by active mass? Also write its unit.

Ans The term active mass represents the concentration in mol dm^{-3} of reactants and products.

$$\text{Active mass concentration} = \frac{\text{Number of moles}}{\text{Volume in } dm^3} = \frac{n}{V}$$

Generally, an active mass is considered as the molar concentration in units of mol dm^{-3}.

(ii) What is meant by reversible reactions?

Ans A reaction in which the products can recombine to form reactants are called reversible reaction. These reactions never go to completion. These are represented by a double arrow ($\rightleftharpoons$) between reactants and products.

(iii) Write down chemical equilibrium state.

Ans When the rate of forward reaction takes place at the rate of reverse reaction, the composition of the reaction mixture remains constant, it is called a chemical equilibrium state.

(iv) Define law of mass action.

Ans This law states that "The rate at which a substance reacts is directly proportional to its active mass and the rate of reaction is directly proportional to the product of active masses of the reacting substances."

(v) Write two important properties of salts.

Ans Following are two properties of salts:

1. Salts are ionic compounds found in crystalline form.

2. They have high melting and boiling points.

(vi) Write two uses of sulphuric acid.

Ans Following are the two uses of sulphuric acid:

1. Sulphuric acid is used to manufacture fertilizers, ammonium sulphate, calcium superphosphate, explosives, paints, dyes, drugs.
2. It is also used as an electrolyte in lead storage batteries.

(vii) State Arrhenius concept of acids and bases.

Ans According to Arrhenius concept:

Acid is a substance which dissociates in aqueous solution to give hydrogen ions.

On the other hand, base is a substance which dissociates in aqueous solution to give hydroxide ions.

(viii) Define adduct.

Ans The product of any Lewis acid base reaction is a single specie called adduct.

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3. Write short answers to any FIVE (5) questions: 10

(i) Define carbonization.

Ans Conversion of wood into coal is called carbonization. It is a very slow bio-chemical process.

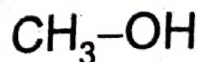
(ii) Write the name of four different types of coal.

Ans Following are the name of four different types of coal:

1. Peat 2. Lignite 3. Bituminous
4. Anthracite

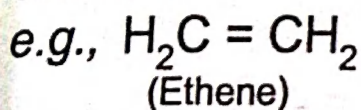
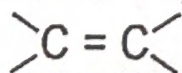
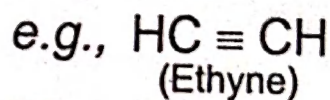
(iii) Define alcoholic group with one example.

Ans The functional group of alcohol is –OH. Their general formula is ROH, where R is any alkyl group.

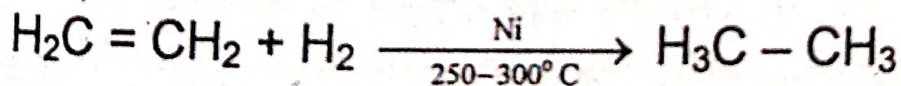
Example:

CH_3-OH
Methyl alcohol

v) What is the difference between alkenes and alkynes?

Ans

	Alkenes		Alkynes
	The compounds in which two carbon atoms are linked by a double bond are called alkenes. *e.g.,* $H_2C = CH_2$ (Ethene)	1.	The compounds in which carbon atoms are linked by a triple bond are called alkynes. *e.g.,* $HC \equiv CH$ (Ethyne)
	Their function group is $>C = C<$	2.	Their function group is $-C \equiv C-$

) Define process of hydrogenation with an example.

Ans The addition of molecular hydrogen in alkenes and alkynes is called hydrogenation. The hydrogenation occurs in the presence of nickel catalyst at 250°C – 300°C. However, in the presence of catalyst platinum or palladium, the reaction takes place at room temperature *e.g.,*

$$H_2C = CH_2 + H_2 \xrightarrow[250-300^\circ C]{Ni} H_3C - CH_3$$

vi) What is the difference between oil and ghee?

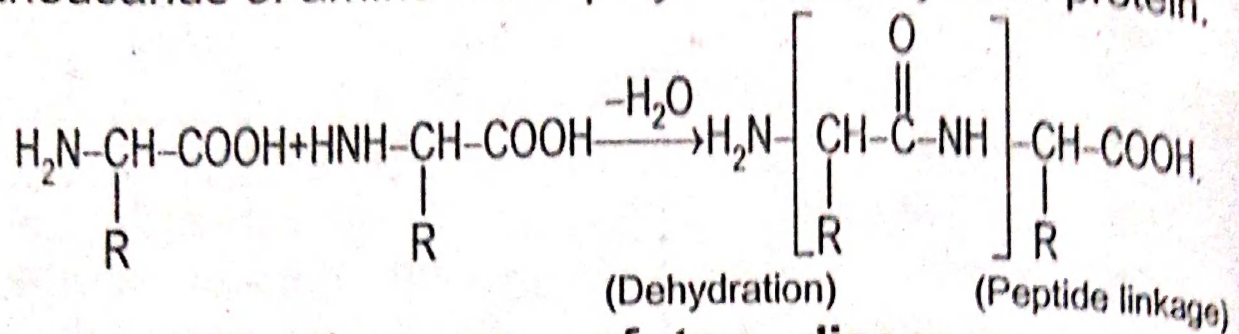
Ans Oils exist in liquid form at room temperature. They are triglycerides of unsaturated fatty acids.

While fats or ghee exist in solid form at room temperature. They are triglycerides of saturated fatty acids.

(vii) **Write the basic unit of protein, give one example.**

Ans The basic unit of protein is amino acid. When thousands of amino acids polymerize they form protein.

$$H_2N-\underset{\substack{| \\ R}}{CH}-COOH + HNH-\underset{\substack{| \\ R}}{CH}-COOH \xrightarrow{-H_2O} H_2N-\left[\underset{\substack{| \\ R}}{CH}-\overset{\substack{O \\ ||}}{C}-NH\right]-\underset{\substack{| \\ R}}{CH}-COOH$$

(Dehydration) (Peptide linkage)

(viii) **Write the name of two diseases caused by deficiency of vitamin A.**

Ans Diseases caused by the deficiency of vitamin A are night-blindness and eye inflammation.

4. Write short answers to any FIVE (5) questions: 10

(i) **Name the major constituents of troposphere.**

Ans The major constituents of the troposphere are nitrogen and oxygen gases. These two gases comprise 99% by volume of the Earth's atmosphere.

(ii) **Write four natural systems of our earth (only names).**

Ans Our planet, the Earth, has four natural systems:

1. Lithosphere 2. Hydrosphere
3. Atmosphere 4. Biosphere

(iii) **Why CO_2 is called a greenhouse gas?**

Ans Greenhouse effect is proportional to amount of CO_2 in air. Greater is amount of CO_2, more is trapping of heat or warming. This is why, CO_2 is called greenhouse gas.

(iv) **Mention the disadvantages of detergents.**

Ans Following are the disadvantages of detergents:

1. Some of the detergents are non-biodegradable. When household water containing these detergents

is discharged in streams, ponds, lakes and rivers, it causes water pollution.

2. The detergent remains in the water for a long time and makes the water unfit for aquatic life.

(v) How water-borne diseases can be prevented?

Ans Water-borne diseases can be prevented by taking the following measures:

1. Provision of safe water
2. Disposal of sewage
3. Control of toxic chemicals

(vi) Write two advantages of Solvay's process.

Ans Following are two of the advantages of Solvay's process are:

(i) It is a cheap process. The material required for this process is available at low price.

(ii) In this process, CO_2 and ammonia are recovered and re-used.

(vii) Define petroleum and crude oil.

Ans **Petroleum:**

Petroleum is a natural product found under the Earth's crust trapped in rocks. Petroleum means rock oil.

Crude oil:

When a decomposition process took place in the absence of air because of high pressure, temperature and bacterial effects. Process took millions of year for completion. Thus remains of dead plants and animals were converted into a dark brownish viscous oil, which is called crude oil.

(viii) Define residual oil with two fractions name.

Ans The residual oil, which does not vapourize under some conditions is collected and heated above 400°C for further fractional distillation.

The fraction names are lubricants; paraffin wax.

(Part-II)

NOTE: Attempt any TWO (2) questions.

Q.5.(a) Define equilibrium constant. How the extent of reaction can be predicted with the help of value of K_c? (5)

Ans **Equilibrium Constant:**

Equilibrium constant is a ratio of the product of concentration of products raised to the power of coefficient to the product of concentration of reactants raised to the power of coefficient as expressed in the balanced chemical equation.

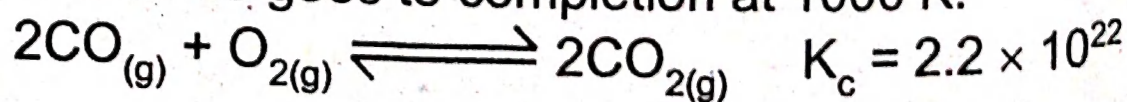
Predicting Extent of a Reaction:

Numerical value of the equilibrium constant predicts the extent of a reaction. It indicates to which extent reactants are converted to products.

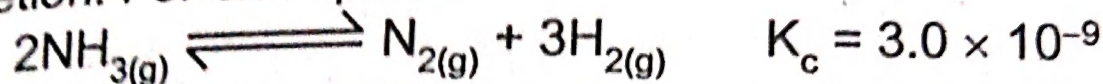
In general, there are three possibilities of predicting extent of reactions as explained below:

(a) Large numerical value of K_c:

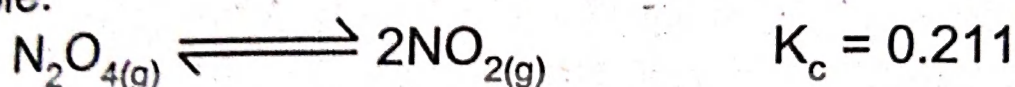
The large value of K_c indicates that at equilibrium position, the reaction mixture consists of almost all products and reactants are negligible. The reaction has almost gone to completion. For example, oxidation of carbon monoxide goes to completion at 1000 K.

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)} \quad K_c = 2.2 \times 10^{22}$$

(b) Small numerical value of K_c:

When the K_c value of reaction is small, it indicates that the equilibrium has established with a very small conversion of reactants to products. At equilibrium position, almost all reactants are present but amount of products is negligible. Such type of reactions never go to completion. For example:

$$2NH_{3(g)} \rightleftharpoons N_{2(g)} + 3H_{2(g)} \qquad K_c = 3.0 \times 10^{-9}$$

(c) Numerical value of K_c is neither small nor large:

Such reactions have comparable amounts of reactants and products at equilibrium position. For example:

$$N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)} \qquad K_c = 0.211$$

It indicates that the rates of decomposition of N_2O_4 and combination of NO to form N_2O_4 are almost comparable to each other.

(b) Write down the four uses of bases. (4)

Ans Following are the four uses of bases:

(i) ***Sodium hydroxide*** is used for manufacturing of soap.

(ii) ***Calcium hydroxide*** is used for manufacturing of bleaching powder, softening of hard water and neutralizing acidic soil and lakes due to acid rain.

(iii) ***Potassium hydroxide*** is used in alkaline batteries.

(iv) ***Magnesium hydroxide*** is used as a base to neutralize acidity in the stomach. It is also used for the treatment of bee's stings.

Q.6.(a) Write down five physical properties of alkenes. (5)

Ans Following are the five physical properties of alkenes:

(i) The first member of the alkenes is ethene. It is a colourless gas with pleasant odour.

(ii) Alkenes are nonpolar, therefore, they are insoluble in water but soluble in organic solvents.

(iii) The first member of the series, ethene, is slightly less dense than air.

(iv) Alkenes are flammable hydrocarbons. On complete combustion, they form carbon dioxide and water with release of energy. However, their flame is smokier than alkanes having a similar number of carbon atoms.

(v) Their melting and boiling points gradually increase with the increase of molecular sizes of the compounds in the series.

(b) Write a note on Deoxyribonucleic acid (DNA). (4)

Ans Deoxyribonucleic Acid (DNA):

DNA consists of deoxyribose sugar. Its structure was discovered by J. Watson and F. Crick in 1953. It is long double stranded molecule consisting of two chains. Each chain is made up of sugar, phosphate and a base. The sugar and phosphate groups make the backbone of the chains and two chains are linked through bases. The chains are wrapped around each other in a double helix form.

DNA is the permanent storage place for genetic information in the nucleus of a cell. It carries and stores all genetic information of the cell. It passes these informations as instructions from generation to generation how to synthesize particular proteins from amino acids. These instructions are 'genetic code of life.' They determine whether an organism is a man or a tree or a donkey and whether a cell is a nerve cell or a muscle cell.

The sequence of nitrogenous bases in DNA determines the protein development in new cells. The function of the double helix formation of DNA is to ensure that no disorder takes place. DNA carries genes that controls the synthesis of RNA. Errors introduced into the genes synthesize faulty RNA. It synthesizes faulty proteins that do not function the way they are supposed to. This disorder causes genetic diseases.

Q.7.(a) What is meant by concentration of Ore? Also give two methods for concentration of Ores. (5)

Ans Concentration of Ore:

The process of removal of gangue from the ore is technically known as concentration and the purified ore is called the concentrate.

Following processes are involved in the concentration of crushed ore:

(i) Gravity separation:

It is based on the differences in densities of the metallic ore and the gangue particles. In this process, powdered heavy metal bearing ore settles down on agitation in a stream of water. While the lighter gangue particles are carried away by water.

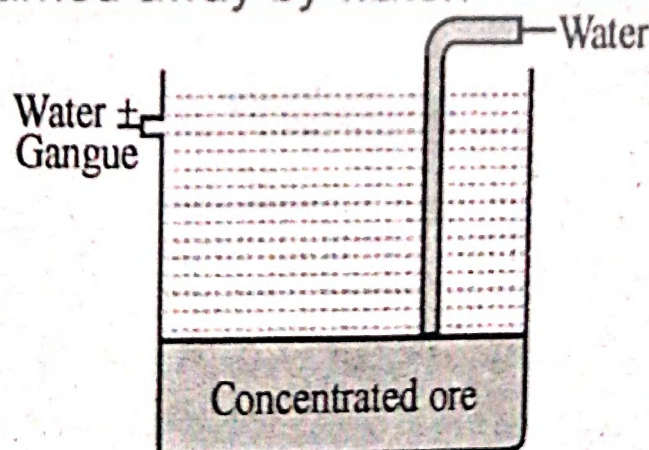



Fig. Gravity separation.

(ii) Froth flotation process:

In this process, the ore particles are preferentially wetted by oil and the gangue particles by the water. The

whole mixture is agitated with compressed air. Hence, the oil coated ore particles being lighter come to the surface in the form of a froth that can be skimmed as shown in figure.

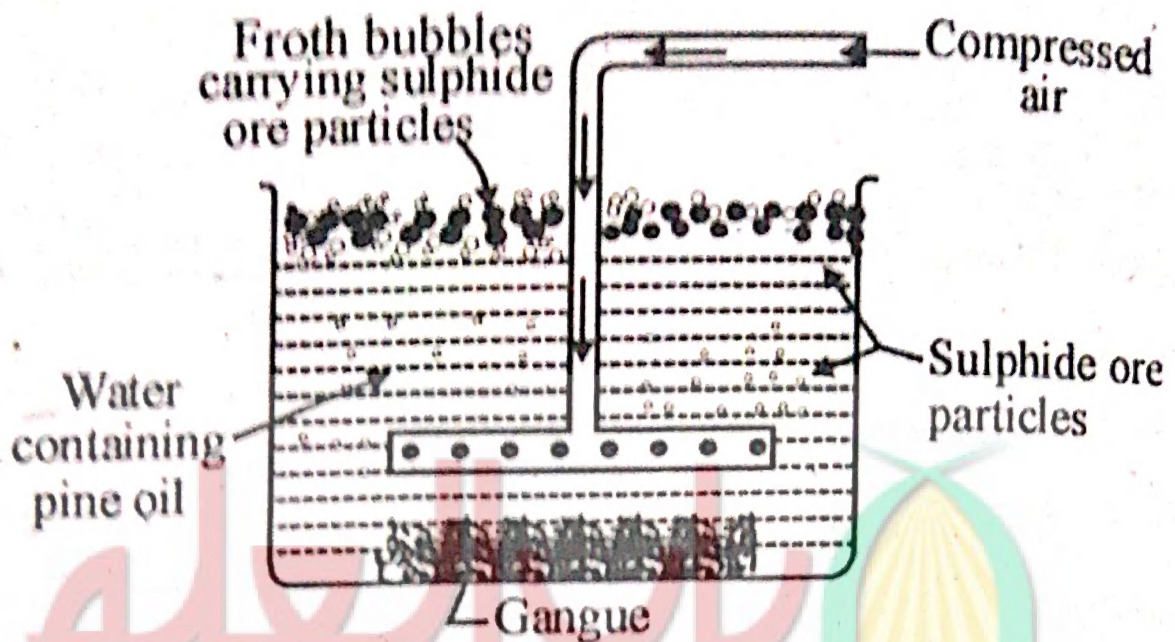



Fig. Froth flotation process.

(b) Write two methods for removal of permanent hardness of water. **(4)**

Ans For Answer see Paper 2016 (Group-II), Q.8.(a).